

Report Information
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Hierarchical scene change detection in an MPEG-2 compressed video sequence.

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Author(s)

Taehwan-Shin, Jae-Gon-Kim, Hankyu-Lee, Jinwoong-Kim.

Author affiliation

Taehwan Shin, Kwangju Inst. of Sci. & Technol., South Korea.

Abstract

In this paper, we propose an efficient **scene change** detection algorithm for direct processing of MPEG-2 video bitstreams. The proposed algorithm utilizes the hierarchical structure of the compressed bitstreams and statistical characteristics of the coded parameters, thus greatly reducing computational requirement compared to pixel domain processing with full decompression. Occurrence of **scene change** is checked first in a GOP level, and if the result is affirmative it is checked again in lower levels: sub-GOP and each picture. We used several metrics for different levels: variance of DC images for I-pictures, number of macroblock types for P-pictures and **motion vector** types for B-pictures.

Descriptors

DATA-COMPRESSION; IMAGE-SEGMENTATION; IMAGE-SEQUENCES; **MOTION**-ESTIMATION; VIDEO-CODING.

Classification codes

B6140C Optical-information-image-and-video-signal-processing*;
B6120B Codes;
C5260B Computer-vision-and-image-processing-techniques*;
C1250 Pattern-recognition;
C1260 Information-theory.

Keywords

hierarchical-scene-change-detection; MPEG-2-compressed-video-sequence;
video-bitstreams; statistical-characteristics; coded-parameters;
computational-requirement; GOP-level; sub-GOP; DC-images; I-pictures;
macroblock-types; P-pictures; **motion**-vector-types; B-pictures.

Treatment codes

P Practical;
T Theoretical-or-mathematical;
X Experimental.

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English.

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Scene decomposition of MPEG compressed video.

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Author(s)

Liu–H–C–H, Zick–G–L.

Author affiliation

Liu, H.–C.H., Zick, G.L., Dept. of Electr. Eng., Washington Univ., Seattle, WA, USA.

Abstract

This paper presents the video processing techniques for indexing MPEG video sequences. Parameters encoded in P– and B–pictures are used to detect **scene** changes. In the MPEG format, P– and B–pictures consist of two types of information: difference matrix and **motion vector(s)** for every macroblock (MB). Different types of MBs indicate the relationship between the current picture and its reference picture(s). The proposed techniques take advantage of those parameters encoded in the MPEG video streams to detect **scene** changes. Since **motion** information in the MPEG format is used, these novel techniques are reliable, accurate, and fast. Those techniques and algorithms are presented in detail and examples are provided.

Descriptors

IMAGE–MATCHING; IMAGE–SEQUENCES; VIDEO–CODING; VIDEO–SIGNAL–PROCESSING; VISUAL–DATABASES.

Classification codes

B6140C Optical–information–image–and–video–signal–processing*;

C5260B Computer–vision–and–image–processing–techniques*;

C1250 Pattern–recognition;

C6160S Spatial–and–pictorial–databases.

Keywords

scene–decomposition; MPEG–compressed–video; video–processing–techniques; video–indexing; **scene**–change–detection; difference–matrix; **motion**–vector; macroblock; **motion**–information.

Treatment codes

P Practical;

T Theoretical–or–mathematical.

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